

MPM 1D Opener Eqn of a Line

A  $(4, -3)$  B  $(6, -5)$   
 $x_1, y_1$   $x_2, y_2$

$y = mx + b$

$m = \frac{y_2 - y_1}{x_2 - x_1}$   $\frac{\Delta y}{\Delta x}$   $\frac{\text{rise}}{\text{run}}$

$= \frac{-5 - (-3)}{6 - 4}$

$= \frac{-5 + 3}{6 - 4}$

$= \frac{-2}{2}$

$= -1$

$y = -1x + b$

$-5 = -1(6) + b$

$-5 = -6 + b$

$-5 + 6 = -6 + b$

$+1 = b$

$y = -1x + 1$

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ii)  $y = mx + b$   $M = -6$

$y = -6x + b$   $(7, 5)$   
 $x, y$

$5 = -6(7) + b$

$5 = -42 + b$

$5 + 42 = b$

$47 = b$

$y = -6x + 47$

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iii)  $y = 4x - 2$   $b = -2$   $(3, 6)$   
 $x, y$

$y = mx - 2$

$6 = m(3) - 2$

$6 = 3m - 2$

$6 + 2 = 3m$

$8 = 3m$

$\frac{8}{3} = \frac{3m}{3}$

$y = \frac{8}{3}x - 2$

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ii) Creating Equations from Slope

p 136 Slopes & Equations  
of Lines in Special Cases

Parallel Lines

ie  $y = 4x$  and  $y = 4x + 2$

-are lines that are always the same distance apart

-these lines have the same slope

$m = \text{the same} \therefore \text{parallel}$

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Perpendicular Lines

ie  $y = \frac{1}{3}x + b$  and  $y = -3x - 8$

$y = -\frac{3}{2}x - 2$  and  $y = \frac{2}{3}x + 4$

These lines intersect at exactly  $90^\circ$ . The slopes of these lines are negative reciprocals of each other.

perpendicular  $m = -ve \text{ reciprocals}$

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Horizontal Line

$y = 3$

Don't pass the x axis

$m = 0$  horizontal line

$(-3, 3)$   $(2, 3)$   
 $x_1, y_1$   $x_2, y_2$

$M = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{3 - 3}{2 - (-3)}$

$= \frac{0}{5}$

$= 0$

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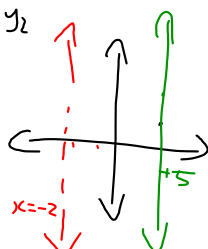
$(6, 5)$   $(3, 5)$   
 $x_1, y_1$   $x_2, y_2$   
 $y = mx + b$   
 $m = \frac{y_2 - y_1}{x_2 - x_1}$   $y = 0(x) + b$   
 $\frac{5 - 5}{3 - 6}$   $y = 0x + b$   
 $\frac{0}{-3}$   $5 = 0(6) + b$   
 $= -\frac{0}{3}$   $5 = b$   
 $y = 0x + 5$   
 $y = 5$

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Find the eqn of a line that is  
 Perpendicular to  $y = 2x + 3$   
 and passes through the point  
 $(-1, -5)$   
 $x, y$   $\frac{+2}{1} = -\frac{1}{2}$  perpen  
 $y = -\frac{1}{2}x + b$   
 $-5 = -\frac{1}{2}(-1) + b$   
 $-5 = +\frac{1}{2} + b$   
 $-5 - \frac{1}{2} = b$   
 $-\frac{10}{2} - \frac{1}{2} = b$   
 $-\frac{11}{2} = b$   
 $y = -\frac{1}{2}x + \frac{11}{2}$   $y = -\frac{1}{2}x - \frac{11}{2}$


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Vertical Lines  
 $(5, 3)$   $(5, 6)$   
 $x_1, y_1$   $x_2, y_2$   
 $m = \frac{y_2 - y_1}{x_2 - x_1}$   
 $= \frac{6 - 3}{5 - 5}$   
 $= \frac{3}{0}$   
 $= \infty$   
 $x = +5$   
 Vertical line =  $\infty$  slope



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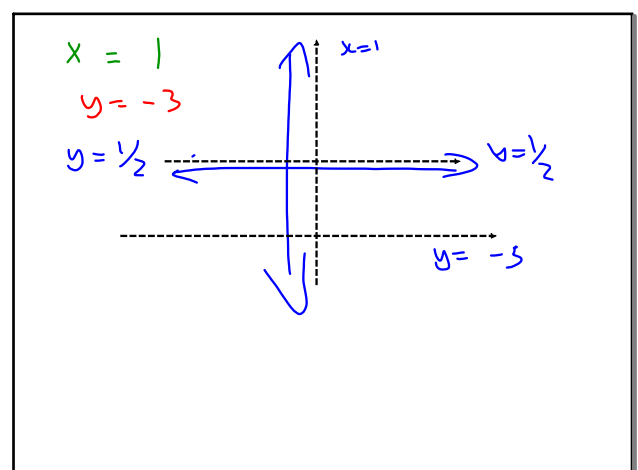
p139  
 8c)  $m = \infty$   
 $A(3, 9)$   
 $x = +3$   
 8d)  $m = 0$   $y = 0x + b$   
 $B(2, 1)$   
 $x, y$   $y = 1$   
 9b) Parallel  $y = 2$   
 $(2, 5)$   
 $y = 5$   
 9c) Perpen



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Hmk.  
 p139  
 q 1 (a) (b) (c)  
 4, 6, 9, 9 a) c) , 10 a, b 11  
 Review Test →  
 CH. 2  
 q. 1-17  
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Oct 6-7:38 AM